7-CO-RD4-TTO-001

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TECOM PROJECT NO. 7-CO-RD4-TTO-001
USATTC REPORT NO. 840910

METHODOLOGY INVESTIGATION

UNIT 2 REPORT

STREAMLINED TEST REPORTING AND PLANNING (STRAP): DATA FLOW PROCEDURES

by

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Materiel Test Division

UNITED STATES ARMY TROPIC TEST CENTER

APO MIAMI 34004

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Period Covered:
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Prepared for:
US Army Test and Evaluation Command, Aberdeen Proving Ground, MD 21005

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ABERDEEN PROVING GROUND, MARYLAND 21005

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ATTENTION OF
DRSTE-AD-M

24 JUL 1984

SUBJECT: Methodology Investigation Final Report - Streamlined Test Reporting and Planning (STRAP) Data Flow Procedures

Commander
US Army Tropic Test Center
ATTN: STETC-MTD
APO Miami 34004

Subject report has been reviewed and is approved.

FOR THE COMMANDER:

Grover H. Shelton

GROVER H. SHELTON
C, Meth Imprv Div
Analysis Directorate

REPORT DOCUMENTATION PAGE

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number):
From 16 January through 16 April 1984, the US Army Tropic Test Center conducted an investigation to develop a computerized system for tracking the flow of data from the field to the Data Analysis Laboratory during active testing. Data flow events were defined and interfaced successfully with the appropriate computerized Test Status Information Program test planning and reporting events. A computerized calendar from the Statistical Analysis System Institute was used to develop a data flow plan which schedules

Block 20 (concluded)

data hand-off events from the field to the Data Analysis Laboratory to ensure sufficient lead time for timely data reduction and analysis. This lead time permits data validation during the test execution phase and provides reduced data to subtest authors for timely completion of final test reports.

DEPARTMENT OF THE ARMY
UNITED STATES ARMY TROPIC TEST CENTER
APO MIAMI 34004

STETC-MTD-A

SUBJECT: Streamlined Test Reporting and Planning (STRAP) Methodology Investigation: Unit 2 Report -- Data Flow Procedures, TECOM Project No. 7-CO-RD4-TTO-001

SEE DISTRIBUTION

1. BACKGROUND

a. This is the second methodology report for the STRAP investigation. The methodology investigation proposal is attached as enclosure 1.

b. The US Army Tropic Test Center (USATTC) has developed a set of management tools to aid in planning and executing its testing program. These include procedures developed in previous methodology investigations, such as Computer Aided Test Planning (CATPLAN) and Reliable Acquisition Processing and Integration of Data (RAPID). To fill the gaps between CATPLAN, RAPID, and other methodology investigations, USATTC has developed a Test Officer's Guide (TOG) for the Center, which provides the overall structure of events that take place in developing a test plan, executing a test, and developing the final test report. Another tool, the Test Status Information Program (TSIP), a software system developed in-house for use in the IBM 4331, provides a computerized calendar schedule for tracking test planning and test reporting events. Efforts are also under way to implement a computerized calendar for tracking test execution events, which will also be a part of TSIP. The TOG provides a detailed description of each test planning, test execution, and test reporting event in TSIP. However, neither TOG nor TSIP provides a system for tracking the data flow from the field to the Data Analysis Laboratory (DAL), as various types of data are collected during active testing.

c. USATTC identified a requirement for a system which defines procedures for data collection and flow throughout active testing and test reporting, to include data transmittal to the DAL.

2. OBJECTIVE

Develop a procedure for using data flow plans during active tests, to include data transmittal procedures to the DAL.

3. SUMMARY OF PROCEDURES

a. This was a 3-month project under the STRAP methodology investigation, performed by the mathematical statistician under the guidance of the Chief, Analysis Branch. At the beginning of this project, USATTC had 18 months of experience with the current TOG and TSIP. However, because test execution events were not computerized fully for tracking by TSIP, there was only a general understanding of how the data flowed and of the data transmittal events which interfaced with USATTC laboratories and key test personnel.

b. During the first phase of this project, the basic TOG and TSIP events connected with the flow of data (within the framework of the TOG and TSIP) were analyzed. Key test personnel and laboratories supporting test data collection, reduction, and analysis were consulted to determine how they might best accomplish their responsibilities related to data flow events. Discussions were held with the reliability engineer, operations research analyst, test officers, and scientists, engineers, and technicians in the chemical, materials, human factors, data analysis, instrumentation, and image systems laboratories.

c. When these discussions were completed, a concept for design and formulation of the data flow plan (DFP) was accomplished. In general, the DFP was designed to aid in managing test data to ensure timely data analysis in support of test execution and test reporting. The DFP events were designed to interface with the TOG, which provides a step-by-step list of events (each with a responsible person) that occur in testing. These TOG steps were designed to track with the steps in the TSIP, USATTC's computerized method of tracking and controlling events and their suspense dates for all tests. The DFP also was designed to be a part of the TSIP calendar for the test conduct schedule. However, because the TSIP schedule has not been implemented fully for test conduct events, a monthly schedule was developed using the computerized Statistical Analysis System calendar function to relate the DFP events to the appropriate test conduct events. Listed below are specific functions of the DFP and a brief description of how they relate to test conduct and reporting events. These functions ensure:

(1) Revision of data forms/formats. The DFP provides for the data transmittal required by the detailed test plan (DTP). The sample data forms are revised and finalized according to information provided by current technical manuals and other pertinent information usually not available when the DTP was written. Final revision of the DFP and data forms takes place at the Data Analysis Coordination Meeting (DACOM).

(2) Timely data transmittal to key personnel/laboratories. Timely data transmittal allows review and analysis of test data during the test conduct phase, as well as during the test report phase. Data transmittal is made to the data analysis coordinator by the test officer within 3 days after each TSIP event requiring data collection.

(3) Data validation throughout the test conduct phase. Timely data transmittal and review by the appropriate personnel provide for early detection of erroneous or incomplete data caused by human error, incorrect data

acquisition procedures, or instrumentation failures. The DFP ensures that data validation takes place throughout the test conduct phase by the test officer, and the appropriate subtest authors and laboratories. Timely data validation also permits revision of test data acquisition procedures, if required.

(4) Timely data reduction. Data transmittal to the DAL within 3 days after completion of the TSIP event help ensure timely data reduction to:

(a) Assist the test officer in generating Equipment Performance Reports (EPR).

(b) Validate data during the test conduct phase and Data Analysis Review Meeting (DARM).

(c) Accomplish data analysis for final report writing.

d. After formulating the DFP concept, a draft DFP was accomplished for the on-going M1E1 tank test. Further discussion occurred at the DACOM, where data flow events were finalized for each type of data and each major subtest. This DFP was designed as a pilot to be used to develop procedures for using DFPs during active testing.

4. SUMMARY OF RESULTS

a. The results of this project are presented at enclosure 2 in the form of the monthly data flow schedules completed for the M1E1 test. These schedules are calendars showing how data flow from the field to key personnel and laboratories. The data flow milestones are keyed to TSIP and data analysis plan (DAP) milestones, to ensure that the DAL has sufficient lead time for data reduction and analysis. This tie-in to existing management tools helps to ensure that reduced data are provided to subtest authors for timely completion of final test reports. The DFP also provides for timely return of raw data to the test officers' files when the test report boarding process is completed.

b. Enclosure 3 shows the responsibilities of key personnel and laboratories as they relate to data flow events.

5. ANALYSIS

The procedures for developing data flow plans were successful. Events in the DFP (see enclosure 2) were interfaced with appropriate TSIP conduct and

report events to further streamline data flow, data reduction, and data analysis for use in EPRs, data validation, and data analysis for the final report. The DFP also provided for timely data transmittal to allow the DAL to compile its DAP.

6. Distribution for this report is at enclosure 4.

RPBarrere

RICHARD P. BARRERE
Colonel, Infantry
Commanding

4 Encl
as

DISTRIBUTION
IAW Encl 4

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February 1983

METHODOLOGY INVESTIGATION PROPOSAL

1. TITLE. Streamlined Test Reporting and Planning (STRAP)

2. CATEGORY. Environmental Susceptibility

3. INSTALLATION. US Army Tropic Test Center
ATTN: STETC-MTD-A
APO Miami 34004

4. PRINCIPAL INVESTIGATION. Robert J. Fuchs
US Army Tropic Test Center
STETC-MTD-A
APO Miami 34004
AUTOVON 313-285-5412

5. STATEMENT OF THE PROBLEM. Although the US Army Tropic Test Center (USATTC) has come a long way in the past few years to generate an efficient and productive system for preparing test plans and reports, there are a number of areas within the testing operation that need to be streamlined to a more systematic process. Improved operating procedures for the collection, flow, analysis and presentation of test data are needed for more efficient control of data throughout active testing and test reporting. Improvements in the process of developing detailed test plans are also needed, particularly in implementing USATTC's Computer Aided Test Planning (CATPLAN) and in producing computerized forms and questionnaires.

6. BACKGROUND. The lack of personnel has not allowed the Center to streamline the data flow process. Now that the Center is staffed properly in the data analysis area, the operations research and mathematical statistician personnel need to develop standard data handling procedures to fill the gaps between procedures established under previous methodology investigations, such as Computer Aided Test Planning (CATPLAN) and Reliable Acquisition Processing, and Integration of Data (RAPID).

7. GOAL. Specifically, the Center will develop techniques to include, but not be limited to the following:

a. Develop an implementation program for CATPLAN. This computer program will automatically copy issues and criteria from Appendix A and distribute them to their proper location in the CATPLAN subtests.

Encl 1

Streamlined Test Reporting and Planning (STRAP) (continued)

b. Develop a computerized method for producing human factors questionnaires in a standard (but pliable) format such that the computer output can be used as the printed questionnaires and can be inserted into the test plan without having to be formatted and typed by word processing personnel.

c. Develop a procedure for using data flow plans during active tests, to include data hand-off procedures to the Data Analysis Laboratory.

d. Develop an internal operating procedure for the Data Analysis Laboratory.

e. Develop computerized techniques for producing figures that will appear in final reports, such that stored data can be translated into charts and graphs that are acceptable for the final report.

f. Initiate plans to complete the data matrix designed and reported in the final report for Environmental Issues Guide for the Humid Tropics (EIGHT). Completion of the matrix is a necessary step in developing a systematic approach to an environmental test methodology program at USATTC and to developing a foundation for the TECOM environmental testing program.

8. DESCRIPTION. As needs such as the above arise during reviews and analyses of USATTC's operations, they will be defined specifically and undertaken as separate projects under this investigation. Each goal/project will be completed and reported on separately so that reports from the investigation will be produced as separate goals are accomplished.

9. JUSTIFICATION.

a. Problem. The goals stated above are necessary to the efficient operation of this Center. These goals will be accomplished regardless of the funding level of this investigation. The Center will have an approved project to charge direct labor hours and a mechanism for reporting results.

b. Dollar Savings. When available, the proposed technique will have an impact on every test conducted at USATTC. Estimated savings per test would be approximately 100 man-hours.

c. Workload. It is anticipated that the average USATTC test completion rate of 21 tests per year will be maintained in the near future, resulting in a total savings per year of 2,100 man-hours.

d. Recommended TRMS Priority. 1

e. Association with Requirements Documents. Not applicable.

f. Other. This investigation is being conducted to improve turn-around-time in producing USATTC's main products, the detailed test plan and the final test report.

Streamlined Test Reporting and Planning (STRAP) (continued)

10. RESOURCES.

a. Financial.

(1) Funding Breakdown:

	Dollars (thousands)			
	FY83		FY84	
	In-House	Out-of-House	In-House	Out-of-House
Personnel Compensation	--	--	--	--
Travel	--	--	3	--
Contractual Support	--	0.5	--	2
Consultant & Other Services	--	--	--	--
Materials & Supplies	0.5	--	2	--
Equipment	--	--	2	--
Subtotals	0.5	0.5	7	2
FY TOTAL	1.0		9	

(2) Explanation of Cost Categories:

(a) Personnel Compensation: Not applicable.

(b) Travel: Coordination with other Army environmental test and research activities.

(c) Contractual Support: Software Lease.

(d) Consultants: Not applicable.

(e) Materials and Supplies: Not applicable.

(f) Equipment: Not applicable.

b. Anticipated Delays. None.

c. Obligation Plan.

Obligation Rate (Thousand)	FY84	FQ	1	2	3	4
			2.0	2.0	3.0	2.0

Streamlined Test Reporting and Planning (STRAP) (concluded)

d. In-House Personnel.

	FY84			
		Man-Hours		Study Hours
	No.	Required	Available	Required
Phy Sci Admin (GS-1301)	1	100	100	
Opns Rsch Anal (GS-1515)	2	1000	1000	
Elec Engr (GS-0855)	1	100	100	
Math Stat (GS-1529)	2	1900	1900	
Gen Engr (GS-801)	1	80	80	
Rsch Psych (GS-180)	1	200	200	
Program Analyst (GS-345)	1	40	40	
Programmer (GS-344)	1	1200	1200	
Tech Editor (GS-1083)	1	300	300	
Tech Info Spec (GS-)	1	500	500	
Biologist (GS-401)	1	300	300	
TOTAL		5,720	5,720	2,000

11. INVESTIGATION SCHEDULE.

	FY83												FY84											
	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
In-House									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R
Contract									A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

LEGEND:
- - - Active investigation work
A Award of contract
R Final report due at HQ, TECOM

12. ASSOCIATION WITH TOP PROGRAM. This proposal may result in a new TOP.

FRANK S. MENDEZ
Chief, Materiel Test Division

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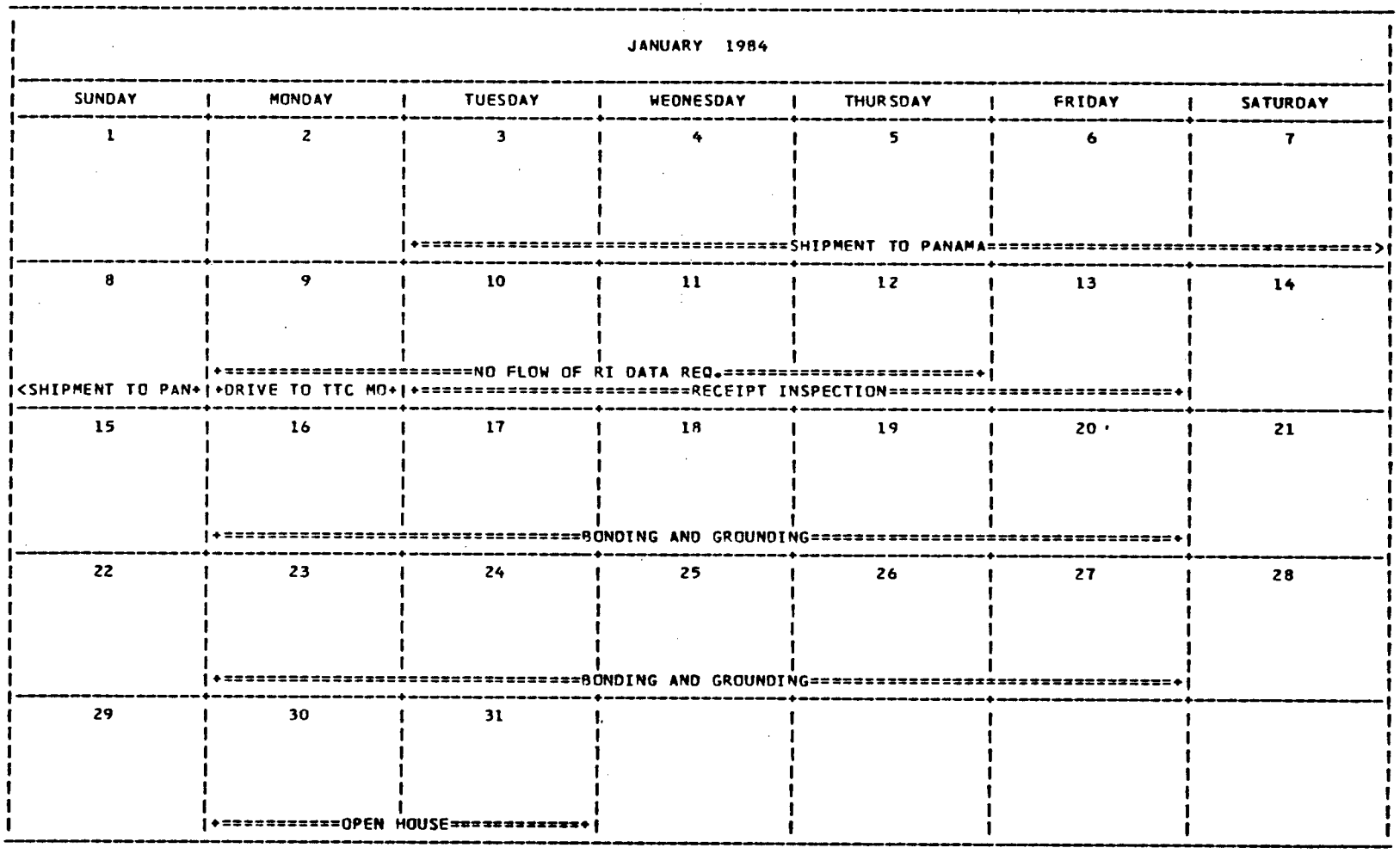
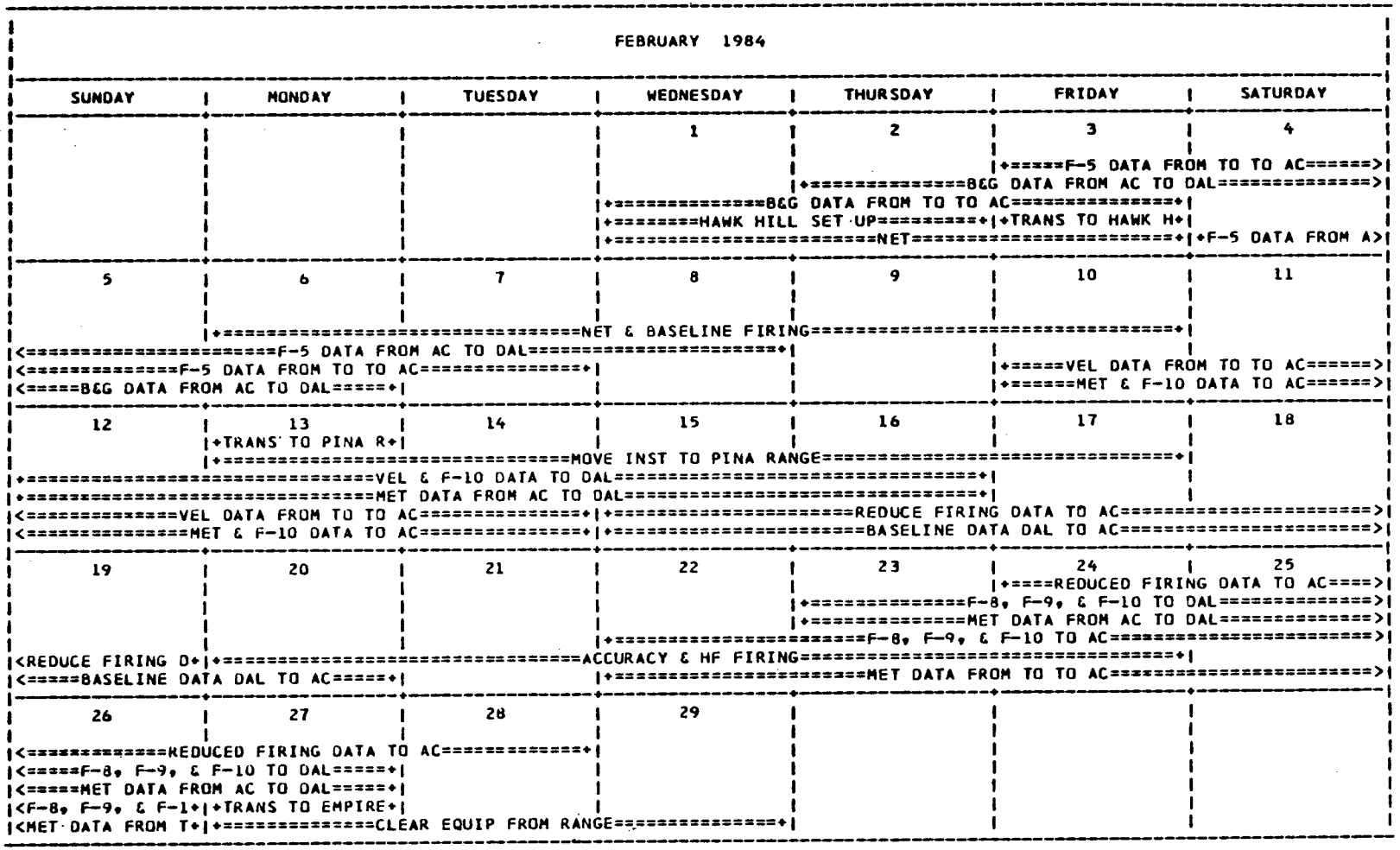
MONTHLY DATA FLOW SCHEDULE




FEBRUARY 1984
SUNDAY
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
1
2
3
4
F-5 DATA FROM TO TO AC
B&G DATA FROM AC TO DAL
B&G DATA FROM TO TO AC
HAWK HILL SET UP
TRANS TO HAWK H
NET
F-5 DATA FROM A
5
6
7
8
9
10
11
NET & BASELINE FIRING
F-5 DATA FROM AC TO DAL
F-5 DATA FROM TO TO AC
B&G DATA FROM AC TO DAL
VEL DATA FROM TO TO AC
MET & F-10 DATA TO AC
12
13
14
15
16
17
18
TRANS TO PINA R
MOVE INST TO PINA RANGE
VEL & F-10 DATA TO DAL
MET DATA FROM AC TO DAL
VEL DATA FROM TO TO AC
MET & F-10 DATA TO AC
REDUCE FIRING DATA TO AC
BASELINE DATA DAL TO AC
19
20
21
22
23
24
25
REDUCED FIRING DATA TO AC
F-8, F-9, & F-10 TO DAL
MET DATA FROM AC TO DAL
F-8, F-9, & F-10 TO AC
REDUCE FIRING D
ACCURACY & HF FIRING
BASELINE DATA DAL TO AC
MET DATA FROM TO TO AC
26
27
28
29
REDUCED FIRING DATA TO AC
F-8, F-9, & F-10 TO DAL
MET DATA FROM AC TO DAL
F-8, F-9, & F-1
TRANS TO EMPIRE
MET DATA FROM T
CLEAR EQUIP FROM RANGE

KEY PERSONNEL RESPONSIBILITIES RELATED TO DEVELOPMENT AND IMPLEMENTATION OF DATA FLOW PLANS

Step No.	Responsible Person(s)	Event
1	Analysis Coordinator (AC)	Develops draft DFP with subtest authors and laboratory personnel for discussion at the DACOM.
2	Subtest Authors/ Lab Personnel	Review and comment on the DFP; participate in the final DFP revision.
3	AC	Chairs the DACOM and finalizes the DFP.
4	Test Officer (TO)	Transmits field data to the Mathematical Statistician (MS).
5	TO	Circulates EPRs to key personnel as specified in the DFP.
6	Laboratories: Instrumentation, Biological, Chemical, Materials	Responsible for hand-offs of laboratory data and analysis results to TO.
7	AC	Receives data from TO, reviews data for completeness, and returns data to the originator if data forms are missing.
8	AC	Transmits complete data sets to the appropriate subtest author or to the DAL.
9	AC, TO, DAL Reliability Engineer (RE)	Review test data as they are received according to the DFP to validate the data being collected.
10	AC, TO, DAL, RE, Biological, Chemical, and Materials Laboratories	Perform data analysis during the test execution phase to assist the TO in developing EPRs and to determine if changes in data collection procedures are required.
11	AC	Revises the DFP if changes in data collected or data collection procedures impact on the data flow or data analyses.

Encl 3

Step No.	Responsible Person(s)	Event
12	AC	Ensures timely data transmittal to the DAL to allow completion of data reduction before the DARM as required by TSIP.
13	AC	Chairs DARM to ensure that all data required in all subtests are complete and valid for their intended use.
14	All Subtest Authors	Determine if additional data are needed after active testing is completed. If additional data are required, ensure that requirements are coordinated with the TO.
15	AC	Adds flow steps to the DFP for supplementary data.
16	TO	Transmits supplementary data to the MS.
17	AC	Transmits supplementary data to the DAL or appropriate subtest author.
18	DAL, Subtest Authors	Returns all raw data to the TO files within 3 days after the final board.

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